

What a syllable can tell us on language

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Language is a system of discrete infinity (DI). Any human being can cope with an infinite number of sentences (syntax) and chunks of well-formed sound/gesture sequences (phonology). Any human has also at his/her disposal an open-ended lexicon. In this paper I put forward the proposal that DI relies on a single mechanism, namely unrestricted, hierarchically binary Merge, in either syntax or phonology. As long as binary Merge is optimally adapted to the interfaces, it shows hierarchical self-embedding only at the CI interface (Hauser, Chomsky & Fitch 2002, Pinker & Jackendoff 2005) while it cannot go beyond a single syllable layer at the SM interface. Articulatory-perceptive restrictions lead to linearity in externalization and, consequently, do not allow for its pieces (features, segments, syllables, etc.) to self-embed. The syllable, however, stands up against linearization pressures: its terminal segments, crucially divided in vowels and consonants, linearize but its hierarchically binary structure remains untouched internally to the mind/brain: [σ onset [$_{\text{rhyme}}$ nucleus coda]]. The syllable, therefore, appears as the clearest evidence that Merge operates at the service of the SM interface. It deserves to be considered a basic building block for “productive combinatorial phonology” (Zuidema & de Boer 2009) which, in turn, has to be understood as “a property of the internal representations”.

Different consequences ensue from the hypothesis that there is only a single binary Merge in language with the syllable and the phrase as its main instructions for SM and CI interfaces, respectively. Let us focus on some of the major ones.

Syllable structure and syntactic structure replicate one another. This non trivial but in general neglected fact led Carstairs-McCarthy (1999) to view the latter as an exaptation of the former. More recent findings on vowels and consonants, however, suggest otherwise and seem to provide strong support to a proposal along the lines set out above. Syllables, and vowels and consonants—or movements and holds, respectively, in Sign Language—go hand in hand; they entail each other. The nucleus is a vowel/-like segment, and the onset and coda are consonants or consonant clusters. The functional specialization and ensuing categorical distinction between vowels and consonants turns out to not be epiphenomenal but foundational (Bonatti et al. 2007, Pons & Toro 2010): the partition cannot be derived from the different place vowels and consonants occupy in a continuous sonority scale and they are not succinct labels for bundles of features. Thus, there are selective deficits that cannot be reduced to either the sonority value in the acoustic continuum or the feature properties (Caramazza et al. 2000, Nespor et al. 2003). The neural mechanisms responsible for vowels and consonants and even their location in the brain seem to be different. There is also a division of labour between them: consonants contribute more to the lexicon and vowels to grammar (Toro et al. 2008). On the other hand, the fact that syllabification crosses word boundaries points out that syllabic structure is not lexically stored but computed on-line, like syntactic structure. In addition, syllables are the units of babbling which all infants, even the deaf ones, practice before learning words. Furthermore, neither syllables nor the distinction between vowels and consonants are found outside human language, unlike plenty of other mechanisms involved in phonological processing (Samuels, Hauser & Boeckx 2011). All in all, this seems to point out that the syllable has to be seen as the result of

Merge when applied to the SM interface. As in syntax, Merge has to play with categorically different elements, hence the distinction between vowels and consonants.

The impact of Merge at SM automatically explains the otherwise elusive character of DI when observed in pseudo-words or non-sense syllable sequences. The ordinary creative use of language depends exclusively on syntactic Merge —hence its primacy. And syntactic Merge works on finite lexicons in which pseudo-words and similar units are excluded by definition. DI in meaningless sound/gesture arrays seems sort of extemporaneous. This overlooked fact shows us that in any language the phonological potential exceeds what the construction of the most richly populated lexicon would require. Of course, this potential underlies the open-ended character of any human lexical inventory, which is useful for coining new words. This, however, even underscores the functionally excessive phonological potential of language provided that the coining of new words shows up very occasionally. In the same vein, consider the fact that this unplanned DI in sound is absent in the rest of combinatorial externalizer animals (birds, cetaceans, etc.). In animal songs, where no construction of meaning is involved, much more restricted combinatorial patterns are observed —take for instance $(a...n)^w$ with n , the number of repeated elements, around ten in humpback whale songs. In their totality, the aforementioned claims lead to the conclusion that a “productive combinatorial phonology”, which goes well beyond any functional expectancy, is a design feature of language. In rigor, Duality of Patterning (DoP), as originally defined in Hockett 1958, is called into question because having “minimal meaningful units made up of meaningless elements” does not entail an open-ended lexicon at all. In other words, a language with a non expandable lexicon fulfilling DoP would qualify as a natural language, counterfactually.

Finally, the proposal put forward here calls for a reassessment of many evolutionary approaches to the evolution of language. It reaffirms the superiority of the internalist vision for the explanation of the key novelties of language in both interfaces. In particular, it calls into question externalist emergentist approaches to combinatorial phonology.

In sum, a unique binary mental operation Merge is not only responsible for all sorts of DI in language but also indissociable of syllables and phrases, the basic building blocks of language.

Selected references

Carstairs-McCarthy, A. (1999) *The Origins of Complex Language. An Inquiry into the Evolutionary Beginnings of Sentences, Syllables, and Truth.* Oxford: Oxford University Press.

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